CLAIMS

1. An electric power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode, said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

2. An electric power generator according to claim 1 and wherein said catalyst includes at least one of metal belonging to the platinum metal group, metal belonging to the transition metal group, metal oxide belonging to the platinum metal group and metal oxide belonging to the transition metal group.

3. An electric power generator according to claim 1 and wherein said base includes at least one of hydroxide of potassium, sodium and lithium.

4. An electric power generator according to claim 3 and wherein said at least one of hydroxide of potassium, sodium and lithium is provided in solution in water.

5. An electric power generator according to claim 1 and wherein said acid includes at least one of sulfuric acid and citric acid.

6. An electric power generator according to claim 5 and wherein said at least one of sulfuric acid and citric acid is provided in solution in water.

7. An electric power generator according to claim 1 and said water-based fuel includes zinc and said catalyst comprises an impurity in said zinc.

8. An electric power generator according to claim 7 and wherein said impurity comprises a transition metal.

9. An electric power generator according to claim 1 and said water-based fuel includes aluminum and said catalyst comprises an impurity in said aluminum.

10. An electric power generator according to claim 9 and wherein said impurity comprises a transition metal.

11. An electric power generator according to claim 1 and said water-based fuel includes magnesium and said catalyst comprises an impurity in said magnesium.

12. An electric power generator according to claim 11 and wherein said impurity comprises a transition metal.

13. An electric power generator according to claim 1 and wherein the extent of availability of said catalyst is controllable.

14. An electric power generator according to claim 13 and wherein said catalyst is formed onto an element which is selectably introducible into said fuel.

15. An electric power generator according to claim 2 and wherein the extent of availability of said catalyst is controllable.

16. An electric power generator according to claim 15 and wherein said catalyst is selectably introducible into said fuel.

17. An electric power generator according to claim 16 and also comprising a catalyst displacer which is operative to selectably mechanically introduce said catalyst into said fuel.

18. An electric power generator according to claim 17 and also comprising a catalyst displacement controller which is operative to control the extent of introduction of said catalyst into said fuel.

19. An electric power generator according to claim 18 and wherein said catalyst displacement controller employs feedback functionality.

20. An electric power generator according to claim 16 wherein said catalyst is selectably introduced into said fuel in liquid form.

21. An electric power generator according to claim 20 and also comprising a liquid catalyst introduction controller which is operative to control the extent of introduction of said catalyst into said fuel.

22. An electric power generator according to claim 21 and wherein said liquid catalyst introduction controller employs feedback functionality.

23. An electric power generator according to claim 1 and wherein:

said catalyst defines a hydrogen generator cathode;

said at least one of zinc, magnesium, iron and aluminum defines a hydrogen generator anode; and

said hydrogen generator anode and said hydrogen generator cathode are electrically interconnected across a resistor.

24. An electric power generator according to claim 1 and wherein:

said catalyst defines a hydrogen generator cathode;

said at least one of zinc, magnesium, iron and aluminum defines a hydrogen generator anode; and

said hydrogen generator anode and said hydrogen generator cathode are electrically interconnected across a variable resistor.

25. An electric power generator according to claim 1 and wherein:

said catalyst defines a hydrogen generator cathode;

said at least one of zinc, magnesium, iron and aluminum defines a hydrogen generator anode; and

said hydrogen generator anode and said hydrogen generator cathode are electrically interconnected across a current controller.

26. An electric power generator according to claim 25 and wherein said current controller is a variable resistance and wherein varying the resistance varies the output of said hydrogen generator.

27. A fuel cell according to claim 23 and wherein said hydrogen generator produces electrical power which is supplied together with electrical power from said fuel cell.

28. An electric power generator according to claim 1 and wherein said salt is selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, acid salts, chromate, stannate, perchlorate and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

29. An electric power generator according to claim 2 and wherein said salt is selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, acid salts, chromate, stannate, perchlorate and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

30. An electric power generator according to claim 7 and wherein said salt is selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, acid salts, chromate, stannate, perchlorate and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

31. An electric power generator according to claim 9 and wherein said salt is selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, acid salts, chromate, stannate, perchlorate and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

32. An electric power generator according to claim 11 and wherein said salt is

selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, acid salts, chromate, stannate, perchlorate and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

33. An electric power generator according to claim 13 and wherein said salt is selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, acid salts, chromate, stannate, perchlorate and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

34. An electric power generator according to claim 14 and wherein said salt is selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, acid salts, chromate, stannate, perchlorate and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

35. An electric power generator according to claim 15 and wherein said salt is selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, acid salts, chromate, stannate, perchlorate and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

36. An electric power generator according to claim 16 and wherein said salt is selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, chromate, stannate, perchlorate acid, salts and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

37. An electric power generator according to claim 1 and wherein the extent of availability of said water-based fuel is controllable.

38. An electric power generator according to claim 37 and wherein availability of said water-based fuel is controllable by selectable introduction of water to a matrix comprising:

at least one of salts, bases and acids;

at least one of zinc, magnesium, iron and aluminum and alloys thereof; and

said catalyst.

39. An electric power generator comprising:

an anode and a cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said anode, said hydrogen generator comprising a catalyst and employing a water-based fuel, wherein the extent of availability of said catalyst is controllable.

40. An electric power generator according to claim 39 and wherein said catalyst is selectably introducible into said fuel.

41. An electric power generator according to claim 39 and wherein said catalyst includes at least one of metal belonging to a group consisting of the platinum metal group, metal belonging to the transition metal group, metal oxide belonging to a group consisting of the platinum metal group and metal oxide belonging to the transition metal group.

42. An electric power generator according to claim 39 and said water-based fuel includes zinc and said catalyst comprises an impurity in said zinc.

43. An electric power generator according to claim 42 and wherein said impurity comprises a transition metal.

44. An electric power generator according to claim 39 and said water-based fuel includes aluminum and said catalyst comprises an impurity in said aluminum.

45. An electric power generator according to claim 44 and wherein said impurity comprises a transition metal.

46. An electric power generator according to claim 39 and said water-based fuel includes magnesium and said catalyst comprises an impurity in said magnesium.

47. An electric power generator according to claim 46 and wherein said impurity comprises a transition metal.

48. An electric power generator according to claim 39 and wherein said base includes at least one of hydroxide of potassium, sodium and lithium.

49. An electric power generator according to claim 48 and wherein said at least one of hydroxide of potassium, sodium and lithium is provided in solution in water.

50. An electric power generator according to claim 39 and wherein said acid includes at least one of sulfuric acid and citric acid.

51. An electric power generator according to claim 50 and wherein said at least one of sulfuric acid and citric acid is provided in solution in water.

52. An electric power generator according to claim 39 and wherein said catalyst is formed onto an element which is selectably introducible into said fuel.

53. An electric power generator according to claim 52 and also comprising a catalyst displacer which is operative to selectably mechanically introduce said catalyst into said fuel.

54. An electric power generator according to claim 53 and also comprising a catalyst displacement controller which is operative to control the extent of introduction of said catalyst into said fuel.

55. An electric power generator according to claim 54 and wherein said catalyst displacement controller employs feedback functionality.

56. An electric power generator according to claim 52 wherein said catalyst is selectably introduced into said fuel in liquid form.

57. An electric power generator according to claim 56 and also comprising a liquid

catalyst introduction controller which is operative to control the extent of introduction of said catalyst into said fuel.

58. An electric power generator according to claim 57 and wherein said liquid catalyst introduction controller employs feedback functionality.

59. An electric power generator according to claim 39 and wherein:

said catalyst defines a hydrogen generator cathode;

said at least one of zinc, magnesium, iron and aluminum defines a hydrogen generator anode; and

said hydrogen generator anode and said hydrogen generator cathode are electrically interconnected across a current controller.

60. An electric power generator according to claim 59 and wherein said current controller is a variable resistance and wherein varying the resistance varies the output of said hydrogen generator.

61. An electric power generator according to claim 59 and wherein said hydrogen generator produces electrical power which is supplied together with electrical power from said electrical power generator.

62. An electric power generator according to claim 39 and wherein the extent of availability of said water-based fuel is controllable.

63. An electric power generator according to claim 62 and wherein availability of said water-based fuel is controllable by selectable introduction of water to a matrix comprising:

at least one of salts, bases and acids;

at least one of zinc, magnesium, iron, aluminum, tin, calcium, sodium, lithium, metal hydrides based on at least one of nickel, titanium, rare earth metals and alloys thereof; and

said catalyst.

64. An electric power generator employing a liquid fuel and comprising:

an anode and a cathode separated by at least one proton exchange membrane, at least one of said at least one proton exchange membrane being an ion-plated, palladium containing, generally non-porous membrane.

65. An electric power generator according to claim 64 and wherein said cathode is a porous cathode.

66. An electric power generator according to claim 65 and wherein said porous cathode is embodied in a porous, electrically conducting, matrix.

67. An electric power generator according to claim 66 and wherein said matrix comprises carbon and platinum based catalyst as well as a binder.

68. An electric power generator according to claim 65 and wherein said at least one of said at least one membrane lies in tight engagement with said porous cathode and is formed on a surface thereof, opposite to that surface which contacts said porous cathode.

69. An electric power generator according to claim 68 and wherein said at least one membrane comprises a non-porous layer containing at least one of palladium metal and palladium alloy.

70. An electric power generator according to claim 69 and wherein another of said at least one membrane lies between said cathode and said non-porous layer containing at least one of palladium metal and palladium alloy.

71. An electric power generator according to claim 69 and wherein said layer has a thickness between 0.2 and 5 microns.

72. An electric power generator according to claim 69 and wherein said anode is porous and lies in tight engagement with said layer containing at least one of palladium

metal and palladium alloy.

73. An electric power generator according to claim 64 and wherein said cathode is exposed to air and said anode is exposed to at least one of methanol and ethanol in solution.

74. An electric power generator according to claim 64 and wherein said anode is embodied in a matrix comprising carbon, platinum and ruthenium based catalyst.

75. An electronic shelf label comprising:

a display; and

an electrical power generator for said display, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

76. An electronic shelf label according to claim 75 and wherein said catalyst includes at least one of metal belonging to the platinum metal group, metal belonging to the transition metal group, metal oxide belonging to the platinum metal group and metal oxide belonging to the transition metal group.

77. An electronic shelf label according to claim 75 and said water-based fuel includes zinc and said catalyst comprises an impurity in said zinc.

78. An electronic shelf label according to claim 77 and wherein said impurity comprises a transition metal.

79. An electronic shelf label according to claim 75 and said water-based fuel includes aluminum and said catalyst comprises an impurity in said aluminum.

80. An electronic shelf label according to claim 79 and wherein said impurity comprises a transition metal.

81. An electronic shelf label according to claim 75 and said water-based fuel includes magnesium and said catalyst comprises an impurity in said magnesium.

82. An electronic shelf label according to claim 81 and wherein said impurity comprises a transition metal.

83. An electric power generator according to claim 75 and wherein said base includes at least one of hydroxide of potassium, sodium and lithium.

84. An electric power generator according to claim 83 and wherein said at least one of hydroxide of potassium, sodium and lithium is provided in solution in water.

85. An electric power generator according to claim 75 and wherein said acid includes at least one of sulfuric acid and citric acid.

86. An electric power generator according to claim 85 and wherein said at least one of sulfuric acid and citric acid is provided in solution in water.

87. An electronic shelf label according to claim 75 and wherein the extent of availability of said catalyst is controllable.

88. An electronic shelf label according to claim 87 and wherein said catalyst is formed onto an element which is selectably introducible into said fuel.

89. An electronic shelf label according to claim 76 and wherein the extent of availability of said catalyst is controllable.

90. An electronic shelf label according to claim 75 and wherein said catalyst is selectably introducible into said fuel.

91. An electronic shelf label according to claim 90 and also comprising a catalyst displacer which is operative to selectably mechanically introduce said catalyst into said fuel.

92. An electronic shelf label according to claim 91 and also comprising a catalyst displacement controller which is operative to control the extent of introduction of said catalyst into said fuel.

93. An electronic shelf label according to claim 92 and wherein said catalyst displacement controller employs feedback functionality.

94. An electronic shelf label according to claim 90 wherein said catalyst is selectably introduced into said fuel in liquid form.

95. An electronic shelf label according to claim 94 and also comprising a liquid catalyst introduction controller which is operative to control the extent of introduction of said catalyst into said fuel.

96. An electronic shelf label according to claim 95 and wherein said liquid catalyst introduction controller employs feedback functionality.

97. An electronic shelf label according to claim 75 and wherein:

said catalyst defines a hydrogen generator cathode;

said at least one of zinc, magnesium iron and aluminum defines a hydrogen generator anode; and

said hydrogen generator anode and said hydrogen generator cathode are electrically interconnected across a current controller.

98. An electronic shelf label according to claim 97 and wherein said current

controller is a variable resistance and wherein varying the resistance varies the output of said hydrogen generator.

99. An electronic shelf label according to claim 98 and wherein said hydrogen generator produces electrical power which is supplied together with electrical power from said fuel cell.

100. An electronic shelf label according to claim 75 and wherein said salt is selected from a group consisting of halides, trihalides, acetates, sulfates, nitrates, borates, chromate, stannate, perchlorate acid, salts and basic salts of Group I metals, ammonium, Group II metals and Group III metals.

101. An electronic shelf label according to claim 75 and wherein the extent of availability of said water-based fuel is controllable.

102. An electronic shelf label according to claim 101 and wherein availability of said water-based fuel is controllable by selectable introduction of water to a matrix comprising:

at least one of salts, bases and acids;

at least one of zinc, magnesium, iron, aluminum, tin, calcium, sodium, lithium, metal hydrides based on at least one of nickel, titanium, rare earth metals and alloys thereof; and

said catalyst.

103. An electronic shelf label comprising:

a display; and

an electrical power generator for said display, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel, wherein the extent of availability of said catalyst is controllable.

104. An electronic shelf label according to claim 103 and wherein said catalyst is selectably introducible into said fuel.

105. An electronic shelf label according to claim 103 and wherein said catalyst includes at least one of metal belonging to the platinum metal group, metal belonging to the transition metal group, metal oxide belonging to the platinum metal group and metal oxide belonging to the transition metal group.

106. An electronic shelf label according to claim 103 and said water-based fuel includes zinc and said catalyst comprises an impurity in said zinc.

107. An electronic shelf label according to claim 106 and wherein said impurity comprises a transition metal.

108. An electronic shelf label according to claim 103 and wherein said water-based fuel includes aluminum and said catalyst comprises an impurity in said aluminum.

109. An electronic shelf label according to claim 108 and wherein said impurity comprises a transition metal.

110. An electronic shelf label according to claim 103 and said water-based fuel includes magnesium and said catalyst comprises an impurity in said magnesium.

111. An electronic shelf label according to claim 110 and wherein said impurity comprises a transition metal.

112. An electric power generator according to claim 103 and wherein said base includes at least one of hydroxide of potassium, sodium and lithium.

113. An electric power generator according to claim 112 and wherein said at least one of hydroxide of potassium, sodium and lithium is provided in solution in water.

114. An electric power generator according to claim 103 and wherein said acid includes at least one of sulfuric acid and citric acid.

115. An electric power generator according to claim 114 and wherein said at least one of sulfuric acid and citric acid is provided in solution in water.

116. An electronic shelf label according to claim 103 and wherein said catalyst is formed onto an element which is selectably introducible into said fuel.

117. An electronic shelf label according to claim 116 and also comprising a catalyst displacer which is operative to selectably mechanically introduce said catalyst into said fuel.

118. An electronic shelf label according to claim 117 and also comprising a catalyst displacement controller which is operative to control the extent of introduction of said catalyst into said fuel.

119. An electronic shelf label according to claim 118 and wherein said catalyst displacement controller employs feedback functionality.

120. An electronic shelf label according to claim 116 wherein said catalyst is selectably introduced into said fuel in liquid form.

121. An electronic shelf label according to claim 120 and also comprising a liquid catalyst introduction controller which is operative to control the extent of introduction of said catalyst into said fuel.

122. An electronic shelf label according to claim 121 and wherein said liquid catalyst introduction controller employs feedback functionality.

123. An electronic shelf label according to claim 103 and wherein:

said catalyst defines a hydrogen generator cathode;

said at least one of zinc, magnesium, iron and aluminum defines a hydrogen generator anode; and

said hydrogen generator anode and said hydrogen generator cathode are electrically interconnected across a current controller.

124. An electronic shelf label according to claim 123 and wherein said current controller is a variable resistance and wherein varying the resistance varies the output of said hydrogen generator.

125. An electronic shelf label according to claim 123 and wherein said hydrogen generator produces electrical power which is supplied together with electrical power from said fuel cell.

126. An electronic shelf label according to claim 103 and wherein the extent of availability of said water-based fuel is controllable.

127. An electronic shelf label according to claim 126 and wherein availability of said water-based fuel is controllable by selectable introduction of water to a matrix comprising:

at least one of salts, bases and acids:

at least one of zinc, magnesium, iron, aluminum, tin, calcium, sodium, lithium, metal hydrides based on at least one of nickel, titanium, rare earth metals and alloys thereof; and

said catalyst.

128. An electronic shelf label employing a liquid fuel and comprising:

a display; and

an electrical power generator for said display, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane,

at least one of said at least one proton exchange membrane being an ion-plated, generally non-porous membrane, containing at least one of palladium and palladium alloy.

129. An electronic shelf label according to claim 128 and wherein said cathode is a porous cathode.

130. An electronic shelf label according to claim 129 and wherein said porous cathode is embodied in an porous, electrically conducting, matrix.

131. An electronic shelf label according to claim 130 and wherein said matrix comprises carbon and platinum as well as a binder.

132. An electronic shelf label according to claim 129 and wherein said at least one of said at least one membrane lies in tight engagement with said porous cathode and is formed on a surface thereof, opposite to that surface which contacts said porous cathode.

133. An electronic shelf label according to claim 132 and wherein said at least one of said at least one membrane comprises a non-porous layer containing at least one of palladium and palladium alloy.

134. An electronic shelf label according to claim 133 and wherein another of said at least one membrane lies between said cathode and said layer containing at least one of palladium and palladium alloy.

135. An electronic shelf label according to claim 133 and wherein said layer has a thickness between 0.2 and 5 microns.

136. An electronic shelf label according to claim 133 and wherein said anode is

porous and lies in tight engagement with said palladium containing layer.

137. An electronic shelf label according to claim 128 and wherein said cathode is exposed to air and said anode is exposed to at least one of methanol and ethanol in solution.

138. An electronic shelf label according to claim 128 and wherein said anode is embodied in a matrix comprising carbon, platinum and ruthenium based catalyst.

139. A method for electrical power generation comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode, said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

140. A method according to claim 139 and also comprising controlling an extent of availability of said catalyst.

141. A method according to claim 140 and wherein said catalyst is selectably introducible into said fuel.

142. A method according to claim 141 and also comprising selectably mechanically introducing said catalyst into said fuel.

143. A method according to claim 142 and also comprising controlling the extent of introduction of said catalyst into said fuel.

144. A method according to claim 143 and wherein said controlling employs feedback functionality.

145. A method according to claim 140 wherein said catalyst is selectably introduced into said fuel in liquid form.

146. A method according to claim 145 and also comprising controlling the extent of introduction of said catalyst into said fuel.

147. A method according to claim 146 and wherein said liquid catalyst introduction controlling employs feedback functionality.

148. A method according to claim 139 and also comprising employing said hydrogen generator to produce electrical power which is supplied together with electrical power from said fuel cell.

149. A method according to claim 139 and also comprising controlling an extent of availability of said water-based fuel.

150. A method according to claim 149 and wherein said controlling is effected by selectable introduction of water to a matrix comprising:

at least one of salts, bases and acids;

at least one of zinc, magnesium, iron, aluminum, tin, calcium, sodium, lithium, metal hydrides based on nickel, titanium, rare earth metals and alloys thereof; and

said catalyst.

151. A method according to claim 139 and wherein said base includes at least one of hydroxide of potassium, sodium and lithium.

152. A method according to claim 151 and wherein said at least one of hydroxide of potassium, sodium and lithium is provided in solution in water.

153. A method according to claim 139 and wherein said acid includes at least one of sulfuric acid and citric acid.

154. A method generator according to claim 153 and wherein said at least one of sulfuric acid and citric acid is provided in solution in water.

155. A method for electrical power generation comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane;

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode; and

governing the operation of said hydrogen generator by controlling the availability of at least one of a catalyst and a water-based fuel in contact with each other.

156. A method according to claim 155 and wherein said catalyst is selectably introducible into said fuel.

157. A method according to claim 155 and also comprising selectably mechanically introducing said catalyst into said fuel.

158. A method according to claim 157 and wherein said selectably mechanically introducing employs feedback functionality.

159. A method according to claim 155 wherein said catalyst is selectably introduced into said fuel in liquid form.

160. A method according to claim 159 and wherein introducing said liquid catalyst employs feedback functionality.

161. A method according to claim 159 and wherein said hydrogen generator produces electrical power which is supplied together with electrical power from said fuel cell.

162. A method according to claim 155 and wherein availability of said water-based

fuel is controllable by selectable introduction of water to a matrix comprising:

at least one of salts, bases and acids;

at least one of zinc, magnesium, iron, aluminum, tin, calcium, sodium, lithium, metal hydrides based on at least one of nickel, titanium, rare earth metals and alloys thereof; and

said catalyst.

163. A method according to claim 155 and wherein said base includes at least one of hydroxide of potassium, sodium and lithium.

164. A method according to claim 163 and wherein said at least one of hydroxide of potassium, sodium and lithium is provided in solution in water.

165. A method according to claim 155 and wherein said acid includes at least one of sulfuric acid and citric acid.

166. A method according to claim 165 and wherein said at least one of sulfuric acid and citric acid is provided in solution in water.

167. A method for electrical power generation comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane including an ion-plated, palladium containing, generally non-porous membrane.

168. A method according to claim 167 and wherein said fuel cell cathode is exposed to air and said fuel cell anode is exposed to at least one of methanol and ethanol in solution.

169. A method of operating an electronic shelf label including a display, said method comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane to power said display; and

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode, said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

170. A method according to claim 169 and also comprising controlling an extent of availability of said catalyst.

171. A method according to claim 170 and wherein said catalyst is selectably introducible into said fuel.

172. A method according to claim 171 and also comprising selectably mechanically introducing said catalyst into said fuel.

173. A method according to claim 172 and also comprising controlling the extent of introduction of said catalyst into said fuel.

174. A method according to claim 173 and wherein said controlling employs feedback functionality.

175. A method according to claim 170 wherein said catalyst is selectably introduced into said fuel in liquid form.

176. A method according to claim 175 and also comprising controlling the extent of introduction of said catalyst into said fuel.

177. A method according to claim 176 and wherein said liquid catalyst introduction controlling employs feedback functionality.

178. A method according to claim 169 and also comprising employing said hydrogen generator to produce electrical power which is supplied together with electrical power from said fuel cell.

179. A method according to claim 169 and also comprising controlling an extent of availability of said water-based fuel.

180. A method according to claim 179 and wherein said controlling is effected by selectable introduction of water to a matrix comprising:

at least one of salts, bases and acids;

at least one of zinc, magnesium, iron, aluminum, tin, calcium, sodium, lithium, metal hydrides based on at least one of nickel, titanium, rare earth metals and alloys thereof; and

said catalyst.

181. A method according to claim 162 and wherein said base includes at least one of hydroxide of potassium, sodium and lithium.

182. Amethod according to claim 181 and wherein said at least one of hydroxide of potassium, sodium and lithium is provided in solution in water.

183. An method according to claim 162 and wherein said acid includes at least one of sulfuric acid and citric acid.

184. A method according to claim 183 and wherein said at least one of sulfuric acid and citric acid is provided in solution in water.

185. A method for operating an electronic shelf label including a display, the method comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane to power said display;

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode; and

governing the operation of said hydrogen generator by controlling the availability of at least one of a catalyst and a water-based fuel in contact with each other.

186. A method according to claim 185 and wherein said catalyst is selectably introducible into said fuel.

187. A method according to claim 185 and also comprising selectably mechanically introducing said catalyst into said fuel.

188. A method according to claim 187 and wherein said selectably mechanically introducing employs feedback functionality.

189. A method according to claim 186 wherein said catalyst is selectably introduced into said fuel in liquid form.

190. A method according to claim 189 and wherein introducing said liquid catalyst employs feedback functionality.

191. A method according to claim 185 and wherein said hydrogen generator produces electrical power which is supplied together with electrical power from said fuel cell.

192. A method according to claim 185 and wherein availability of said water-based fuel is controllable by selectable introduction of water to a matrix comprising:

at least one of salts, bases and acids;

at least one of zinc, magnesium, iron, aluminum, tin, calcium, sodium, lithium, metal hydrides based on at least one of nickel, titanium, rare earth metals and alloys thereof; and

said catalyst.

193. A method according to claim 185 and wherein said base includes at least one of hydroxide of potassium, sodium and lithium.

194. A method according to claim 193 and wherein said at least one of hydroxide of potassium, sodium and lithium is provided in solution in water.

195. A method according to claim 185 and wherein said acid includes at least one of sulfuric acid and citric acid.

196. A method according to claim 195 and wherein said at least one of sulfuric acid and citric acid is provided in solution in water.

197. A method for operating an electronic shelf label including a display, the method comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane including an ion-plated, palladium containing, generally non-porous membrane to power said display.

198. A method according to claim 197 and wherein said fuel cell cathode is exposed to air and said fuel cell anode is exposed to at least one of methanol and ethanol in solution.

199. A method for recharging an electric power generator, the method comprising:

providing an electric power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum;

said catalyst defining a hydrogen generator cathode;

said at least one of zinc, iron, tin and metal hydrides based on at least one of nickel, titanium, rare earth metals and alloys thereof defining a hydrogen generator anode; and

said hydrogen generator anode and said hydrogen generator cathode being electrically interconnected across a current controller;

disconnecting said current controller from said anode and said cathode;

replenishing water in said water-based fuel;

providing a DC current generator and connecting said anode to a negative electrode of said DC current supply and connecting said cathode to a positive electrode of said DC current supply; and

applying electric DC current from said electrodes of said DC current supply to said anode and cathodes of said electric power generator.

200. Means for recharging an electric power generator comprising:

an electric power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

said catalyst defines a hydrogen generator cathode;

said at least one of zinc, iron, tin and metal hydrides based on at least one of nickel, titanium, rare earth metals and alloys thereof defines a hydrogen generator anode; and

said hydrogen generator anode and said hydrogen generator cathode are electrically interconnected across a current controller;

a DC current generator comprising a positive electrode and a negative electrode;

means for disconnecting said current controller from said anode and said cathode and connecting and connecting said anode to said negative electrode of said DC current supply and connecting said cathode to said positive electrode of said DC current generator;

means for replenishing water in said water-based fuel, and

means for applying electric DC current from said electrodes of said DC current supply to said anode and cathodes of said electric power generator.

201. An electronic computing system comprising:

at least one of a processor and a microprocessor; and

an electrical power generator for said at least one of a processor and a microprocessor, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

202. An electronic computing system comprising:

at least one of a processor and a microprocessor; and

an electrical power generator for said at least one of a processor and a microprocessor, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel, wherein the extent of availability of said catalyst is controllable.

203. An electronic computing system comprising employing a liquid fuel and comprising:

at least one of a processor and a microprocessor; and

an electrical power generator for said at least one of a processor and a microprocessor, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane,

at least one of said at least one proton exchange membrane being an ion-plated, generally non-porous membrane, containing at least one of palladium and palladium alloy.

204. A method of operating an electronic computing system including at least one of a processor and a microprocessor, the method comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane to power said at least one of a processor and a microprocessor; and

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode, said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

205. A method for operating an electronic computing system including at least one of a processor and a microprocessor, the method comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane to power said at least one of a processor and a microprocessor;

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode; and

governing the operation of said hydrogen generator by controlling the availability of at least one of a catalyst and a water-based fuel in contact with each other.

206. A method for operating an electronic computing system including at least one of a processor and a microprocessor, the method comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane including an ion-plated, palladium

containing, generally non-porous membrane to power said at least one of a processor and a microprocessor.

207. An electronic mobile communication device comprising:

at least one of a transmitter and a receiver; and

an electrical power generator to provide electrical power to said at least one of a transmitter and a receiver, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

208. An electronic mobile communication device comprising:

at least one of a transmitter and a receiver; and

an electrical power generator to provide electrical power to said at least one of a transmitter and a receiver, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel, wherein the extent of availability of said catalyst is controllable.

209. An electronic mobile communication device comprising employing a liquid fuel and comprising:

at least one of a transmitter and a receiver; and

an electrical power generator to provide electrical power to said at least one of a transmitter and a receiver, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane,

at least one of said at least one proton exchange membrane being an ion-plated, generally non-porous membrane, containing at least one of palladium and palladium alloy.

210. A method of operating an electronic mobile communication device including at least one of a processor and a microprocessor, the method comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane to power said at least one of a processor and a microprocessor; and

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode, said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

211. A method to provide electrical power to operating an electronic mobile communication device including at least one of a transmitter and a receiver, the method comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane to power said at least one of a transmitter and a receiver;

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode; and

governing the operation of said hydrogen generator by controlling the availability of at least one of a catalyst and a water-based fuel in contact with each other.

212. A method to provide electrical power to operating an electronic mobile communication device including at least one of a transmitter and a receiver, the method comprising:

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane including an ion-plated, palladium containing, generally non-porous membrane to power said at least one of a transmitter and a receiver.

213. An electrically operated toy comprising:

a toy;

an electrically operated element; and

an electrical power generator to provide electrical power to said electrically operated element, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

214. An electrically operated toy comprising:

a toy;

an electrically operated element; and

an electrical power generator to provide electrical power to said electrically operated element, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane; and

a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode,

said hydrogen generator comprising a catalyst and employing a water-based fuel, wherein the extent of availability of said catalyst is controllable.

215. An electrically operated toy comprising:

employing a liquid fuel and comprising:

a toy;

an electrically operated element; and

an electrical power generator to provide electrical power to said electrically operated element, said electrical power generator comprising:

a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane,

at least one of said at least one proton exchange membrane being an ion-plated, generally non-porous membrane, containing at least one of palladium and palladium alloy.

216. A method of operating an electrically operated toy, the method comprising:

providing a toy;

providing an electrically operated element inside said toy;

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane to power said electrically operated element; and

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode, said hydrogen generator comprising a catalyst and employing a water-based fuel including one of salts, bases and acids, as well as at least one of zinc, magnesium, iron and aluminum.

217. A method for operating an electrically operated toy, the method comprising:

providing a toy;

providing an electrically operated element inside said toy;

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane to power said at least one of a transmitter and a receiver;

powering said fuel cell by employing a hydrogen generator operative to provide molecular hydrogen to said fuel cell anode; and

governing the operation of said hydrogen generator by controlling the availability of at least one of a catalyst and a water-based fuel in contact with each other.

218. A method for operating an electrically operated toy, the method comprising:

providing a toy;

providing an electrically operated element inside said toy;

employing a fuel cell including a fuel cell anode and a fuel cell cathode separated by at least one proton exchange membrane including an ion-plated, palladium containing, generally non-porous membrane to power said at least one of a transmitter and a receiver.

219. An electric power generator according to claim 1 and wherein said electric power generator fitted inside at least one of mobile electronic apparatus and portable electronic apparatus.

220. An electric power generator according to claim 39 and wherein said electric power generator fitted inside at least one of mobile electronic apparatus and portable electronic apparatus.

221. An electric power generator according to claim 64 and wherein said electric power generator fitted inside at least one of mobile electronic apparatus and portable electronic apparatus.

222. A method according to claim 139 and also comprising fitting said electric power generator inside at least one of mobile electronic apparatus and portable electronic apparatus.

223. A method according to claim 155 and also comprising fitting said electric power generator inside at least one of mobile electronic apparatus and portable electronic apparatus.

224. A method according to claim 167 and also comprising fitting said electric power generator inside at least one of mobile electronic apparatus and portable electronic apparatus.